

PATENT COOPERATION TREATY

PCT



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ACD 3007 P1-WO	FOR FURTHER ACTION	
See Form PCT/PEA/416		
International application No. PCT/EP2004/006536	International filing date (day/month/year) 15.06.2004	Priority date (day/month/year) 20.06.2003
International Patent Classification (IPC) or national classification and IPC C08F2/00, C08F4/34, C08F14/06, C08F2/01		
Applicant AKZO NOBEL N.V. et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
a. <input checked="" type="checkbox"/> <i>(sent to the applicant and to the International Bureau)</i> a total of 2 sheets, as follows:
<input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
<input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
b. <input type="checkbox"/> <i>(sent to the International Bureau only)</i> a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
<input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application

Date of submission of the demand 24.12.2004	Date of completion of this report 23.09.2005
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 eprmu d Fax: +49 89 2399 - 4465	Authorized Officer Gold, J Telephone No. +49 89 2399-8413



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/006536

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3 and 23.1(b))
 - publication of the international application (under Rule 12.4)
 - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*.

Description, Pages

1-19 as originally filed

Claims, Numbers

1-9 received on 24.12.2004 with letter of 22.12.2004

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
- 3. The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos. 10
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
- 4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/006536

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

**Reasoned statement under Rule 70 PCT with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. In this International Preliminary Examination Report (IPER) the following documents are cited:

D1: GB-A-1120147
D2: US-A-6106785
D3: US 4133791

2. Novelty

The subject matter of the present set of claims is novel in the sense of Article 33(2) PCT. The applicant established novelty over D1 by cancellation of original independent claim 10. Novelty of the remaining claims 1-9 over D2 is given. The distinguishing features are "a peroxide with a half life time in between 1 hour and 0.001 hour" and the feature "cooling means of the reactor are kept at essentially maximum cooling capacity".

3. Inventive step

The closest prior art is D2. The problem to be solved is to provide polymerisation processes having improved space-time yield.

The applicant solves the problem by the distinguishing features.

Neither in the closest prior art D2 as such nor in a combination D2/D3 incentives to the proposed problem solution are given. Since the invention is not obvious to a person skilled in the art, it is based on an inventive step in the sense of Article 33(3) PCT.

4. Industrial applicability

Industrial applicability of the invention disclosed in claims 1-9 is given within the sense of Article 33(4) PCT on the field of polymerisation processes.

5. Article 33(1) PCT is met since the subject-matter of claims 1-9 is novel and involves an inventive step.

6. Clarity

6.1. Clarity of the subject-matter of independent claim 1

Clarity of the subject-matter of independent claim 1 is not given within the sense of Article 6 PCT. The term "**at essentially maximum cooling capacity**" is not clear. This unclear expression should be clarified by the definition given on page 2/lines 19-23 of the description.

6.2. Clarity of the subject-matter of dependent claims 4 and 6

Clarity of the subject-matter of claims 4 and 6 is given since the applicant was able to show that the terms "K-value" (as used in dependent claim 4) and "proportional band" (as used in dependent claim 6) are commonly used and clear for the skilled person according to Article 6 PCT.

The term "K-value" is used in order to indicate polymer molecular weight grades as shown for example in Kirk-Othmer Encyclopaedia of Chemical Technology, John Wiley & Sons, 1997, the Chapter on Vinyl chloride Polymers, paragraph 3.

The term "proportional band" is explained in the description on page 5/l 17-21.

7. The description has to be adapted to the amended set of claims, i.e. cancellation of passages referring to the subject-matter of original independent claim 10. Thus, on p 8/l 13 the passage "In another preferred embodiment" has to be cancelled.
8. The passage "In a most preferred embodiment" on p 2/l 23 has to be cancelled.
9. Amendments concerning the objections raised under items 6.1., 7. and 8. should be made during the national or regional phases.

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Amended set of CLAIMS

1. A polymerization process wherein at least one peroxide, with a half life in
5 between 1 hour and 0.001 hour at the polymerization temperature at the
moment of dosing, is dosed to the reaction mixture at the polymerization
temperature and wherein at least during part of the period in which the
peroxide is dosed i) the cooling means of the reactor are kept at essentially
10 maximum cooling capacity and ii) the amount of initiator that is dosed is
actively controlled by a temperature controller such that the desired
polymerization temperature is achieved and maintained within 0.3°C of said
polymerization temperature.
2. The polymerization process of claim 1 wherein the polymerization
15 temperature is maintained within 0.2°C, preferably within 0.1°C, of said
polymerization temperature.
3. The polymerization process of either of claims 1 and 2 wherein the
20 temperature controller controls the temperature of the reaction mixture by
monitoring the temperature of the reaction mixture and/or the pressure of
the gas phase in the polymerization reactor during the polymerization
reaction, while at the same time adjusting the dosing rate of the initiator to
the reaction mixture.
- 25 4. The polymerization process of any one of claims 1 to 3 wherein the polymer
obtained has a K-value within 0.3 units of the desired K-value, preferably
within 0.2 units of the desired K-value.
- 30 5. The polymerization process of any one of the preceding claims wherein the
temperature is controlled by a temperature controller selected from the
group consisting of a PID controller, a PI controller, a PD controller, and a
fuzzy logic controller.

6. A polymerization process according to claim 5 wherein the controller is a PID controller using a proportional band, characterized in that the proportional band of the PID controller is in the range of from 0.6% to 2.5%.

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7. A polymerization process according to claim 6 wherein the temperature sensing means are linked to the proportional and integral input signals of the PID controller and wherein reactor pressure sensing means are linked to the derivative function of the PID controller during at least part of the period
10 in which the peroxide is dosed.

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8. A polymerization process according to any one of the preceding claims wherein vinyl chloride is polymerized, optionally together with other monomers.

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9. A polymerization process according to any one of the preceding claims wherein the polymerization process is a suspension polymerization process.

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